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Daniel K. Tracey

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The Missing Lending Link: Why a Federal Loan Guarantee Program is Critical to the Continued Growth of the Solar Power Industry

I. INTRODUCTION

Solar power's once bright future as a utility-scale¹ power source may be in jeopardy.² Just as the industry began to overcome the deep-rooted hurdles of high equipment costs and low efficiency,³ it now faces another challenge: debt financing. In September 2011, the federal loan guarantee program available to renewable energy generation projects utilizing commercially-proven technologies (1705 Program)⁴ expired, ending a crucial incentive for banks to lend to solar projects,⁵ and in all

1. See Chris Schandera, Siemens Fin. Servs., Presentation on Developing Bankable Solar PV Projects - Key Success Factors (June 16, 2011), *available at* <http://www.industry.usa.siemens.com/topics/us/en/solarexchange/west/Documents/SolarExchange-DevelopingBankableSolarPVProjects20110615.pdf> (defining "utility scale" solar projects as those that range from a few megawatts to a few hundred megawatts); Valerie Rauluk, Venture Catalyst Inc., Presentation on Utility Scale Solar Power Opportunities and Obstacles (Mar. 17, 2008), *available at* <http://giffords.house.gov/Powerpoint/Rauluk.ppt> (defining "[u]tility scale solar energy" as "[a]ny project/program offering high volume, lower-cost, reliable, and dependable solar energy for 20 years plus at fixed prices for large numbers of customers") (presenting to U.S. H.R. Comm. on Science and Tech., Subcomm. on Energy and Env't.).

2. See generally Galen Barbose et al., Tracking the Sun IV, LAWRENCE BERKELEY NAT'L LAB. 2 (Sept. 2011) [hereinafter Tracking], *available at* <http://eetd.lbl.gov/ea/ems/reports/lbnl-5047e.pdf> (summarizing cost trends in photovoltaic solar power systems from 1998 through 2011).

3. See Paul Krugman, Op-Ed., *Here Comes the Sun*, N.Y. TIMES, Nov. 7, 2011, at A25, *available at* <http://www.nytimes.com/2011/11/07/opinion/krugman-here-comes-solar-energy.html> (arguing that solar panel manufacturer Solyndra's failure is actually the result of technological progress in the solar industry and that solar power is on the brink of becoming cost competitive with other forms of energy generation). See *infra* Part V.C., for a discussion of Solyndra's bankruptcy.

4. See American Recovery and Reinvestment Act of 2009 § 1705, 42 U.S.C. § 16516 (Supp. IV 2010) ("The authority to enter into guarantees under this section shall expire on September 30, 2011."). Section 1703 of the Energy Policy Act of 2005, which does not have a sunset date, still allows for DOE to make loan guarantees but only to renewable energy generation projects that "employ new or significantly improved technologies as compared to commercial technologies." 42 U.S.C. § 16513 (2006).

5. This Note focuses on solar power; however, the same or similar challenges apply to wind, geothermal, and a host of other renewable energy generation sources. See generally EDISON ELEC. INST., RENEWABLE ENERGY: GROWTH AND CHALLENGES IN THE ELECTRIC

likelihood stalling “one of the financial engines powering” clean energy investments across the United States.⁶

The 1705 Program was a keystone piece in the solar energy puzzle. From July 2009 through September 2011, the Department of Energy (DOE), acting under the authority of section 1705 of the Energy Policy Act of 2005 (EPAAct),⁷ guaranteed approximately \$12 billion in loans to twelve utility-scale solar power generation projects.⁸ While the 1705 Program was originally intended as a “temporary program” to address the economic downturn beginning in 2008,⁹ it proved to be a catalyst for solar power generation.¹⁰ With the expiration of this critical lending incentive, equity investors, project developers, and technology providers are hesitant to finance solar energy projects in full.

The bankruptcy of solar power component manufacturer Solyndra LLC, a loan guarantee recipient under the now-expired 1705 Program, brought to light a simple, yet serious flaw in the previous program: the federal government provided loan guarantees to both manufacturing facilities and power generation facilities without accommodating for the different risk profiles of the two types of projects.¹¹ A new federal loan guarantee program restricted to energy generation facilities powered by commercially-mature renewable energy technology addresses this exact concern. Such a program will mitigate technological, operational, and financial risk, while still meeting the

POWER INDUSTRY (2008), http://www.eei.org/ourissues/ElectricityGeneration/Documents/RenewEngy_broch.pdf (providing an overview of the technology behind, and challenges faced by, the predominant renewable energy generation resources).

6. Matthew Lynley, *Plunging Solar Panel Prices Claim First Victim: Solyndra Files for Bankruptcy*, GREENBEAT (Sept. 1, 2011), <http://venturebeat.com/2011/09/01/solyndra-bankruptcy-solar-costs/>.

7. See Energy Policy Act of 2005 § 1705, 42 U.S.C. § 16516 (Supp. IV 2010).

8. See PHILLIP BROWN, CONG. RESEARCH SERV., R42059, SOLAR PROJECTS: DOE SECTION 1705 LOAN GUARANTEES 1 (2011).

9. 1705, U.S. DEP'T OF ENERGY LOAN PROGRAMS OFFICE, https://lpo.energy.gov/?page_id=41 (last visited Jan. 18, 2012) (“Section 1705 is a temporary program designed to address the current economic conditions of the nation. It authorizes loan guarantees for certain renewable energy systems, electric power transmission systems and leading edge biofuels projects that commence construction no later than September 30, 2011.”).

10. See *infra* Part V.B.

11. See BROWN, *supra* note 8, at 7-8 (“Section 1705 solar projects fall into one of two categories: (1) solar manufacturing, or (2) solar generation. Risk characteristics for each category are distinctly different and solar manufacturing projects are generally considered higher risk than solar generation projects because the latter can use contractual mechanisms to reduce market, project, and financial risks.”).

goals of increased renewable energy, job creation, and domestic technology growth.¹²

Following this introduction, Part II of this Note will outline the solar industry's significant progress over the last half decade.¹³ Part III discusses the current federal government's renewable energy policy, which uses tax credits, depreciation and, until recently, loan guarantees to incentivize project development.¹⁴ Next, Part IV highlights innovative financing structures that enable investors in utility-scale solar projects to capture these federal incentives.¹⁵ Part V reviews the successes, and notable failure, of the expired 1705 Program.¹⁶ Finally, Part VI lays out why a new, more narrowly tailored loan guarantee program limited to power generation projects will reduce the overall risk to taxpayers while still promoting the use and adoption of utility-scale solar power.¹⁷

II. GLOBAL GROWTH IN THE UTILITY-SCALE SOLAR MARKET

"The tipping point where renewables become the predominant energy option now appears closer than it did just a few years back."¹⁸ In places like Hawaii, with high electricity rates and abundant sun, photovoltaic-generated (PV)¹⁹ solar energy is already cheaper than buying electricity from the grid.²⁰ The cost per watt for energy

12. *See id.* at 8.

13. *See infra* Part II.

14. *See infra* Part III.

15. *See infra* Part IV.

16. *See infra* Part V.

17. *See infra* Part VI.

18. ANGUS MCCORONE ET AL., UNITED NATIONS ENV'T PROGRAMME & BLOOMBERG ENERGY FIN., GLOBAL TRENDS IN RENEWABLE ENERGY INVESTMENT 2011 27 (2011), available at www.unep.org/pdf/BNEF_global_trends_in_renewable_energy_investment_2011_report.pdf (arguing that investment incentives and other government policies deserve much of the credit for technological progress in renewable energy).

19. A typical photovoltaic panel contains a silicon wafer that is treated to form differently charged n-type and p-type silicon, which together create an electric circuit; sunlight activates the solar cell's circuit to create electricity and manufacturers typically connect multiple solar cells to construct a solar module. *See* Julie Burlage, Financial Viability of a 2MW Solar Photovoltaic Installation in the Industrial Sector of New Jersey (Aug. 28, 2009) (unpublished Master's thesis, Nicholas Sch. of the Env't and Earth Sci.) (on file with Duke Univ. Librs.), available at <http://dukespace.lib.duke.edu/dspace/handle/10161/1372?show=ful>.

20. *See* Ben Sills, *Solar Panels Start to Outshine Mirrors*, BLOOMBERG BUSINESSWEEK,

generated by utility-scale PV systems fell by twenty-six percent in 2010 and an additional twelve percent in the first six months of 2011.²¹ The price for PV modules, which comprise approximately half to two-thirds of a utility-scale solar project's cost, dropped fifty-eight percent from 2008 to 2011.²²

The recent drop in PV project costs makes it the current top choice among solar power technologies.²³ In August 2011, Solar Trust of America, the American subsidiary of German solar energy conglomerate Solar Millennium AG, switched the technology on the world's largest solar generating facility currently under development from concentrating solar power²⁴ (CSP) to PV.²⁵ Driving the rapid cost reduction in PV technology is China.²⁶

The United States is a historically weak player in the solar industry; as of 2010, Germany, Spain, Japan, and Italy all led the U.S. in total installed PV capacity.²⁷ Despite President Obama's apparent enthusiasm for "green energy," Chinese companies' investment in

Oct. 13, 2011, at 65 [hereinafter Sills, *Solar Panels*] (arguing additionally that while solar thermal may not ever be able to compete with PV on pure cost, its ability to store power by heating vats of liquid salt may keep it relevant; the International Energy Agency predicts more than one hundred fold increase in solar thermal capacity by 2020, even in light of the recent PV price drop).

21. Tracking, *supra* note 2, at 2.

22. See Press Release, Bloomberg New Energy Finance, Solar Energy Hardware Prices Plunge (June 17, 2011), <http://bnef.com/Downloads/pressreleases/155/pdf>; Tracking, *supra* note 2, at 2 (presenting research data from the first half of 2011 that indicates PV price declines of more than ten percent).

23. *Concentrated Solar Gets a Boost from US*, EURACTIV.COM (Oct. 28, 2011), <http://www.euractiv.com/specialreport-solarpower/concentrated-solar-gets-boost-us-news-508619> (explaining that steep price declines in PV technology, caused by oversupply and the global recession, have increased competitiveness of solar photovoltaic energy relative to competing solar technologies).

24. See *Concentrating Solar Power*, NAT'L RENEWABLE ENERGY LAB. (July 11, 2011), http://www.nrel.gov/learning/re_csp.html (explaining that concentrating solar uses hundreds or thousands of U-shaped mirrors to redirect and focus sunlight on fluid filled tubes, and the hot fluid is in turn used to boil water, turning a turbine generator to produce electricity).

25. Michael Kanellos, *Dark Day for Solar Thermal: Solar Trust Switches 500MW Power Plant to PV*, GREENTECHSOLAR (Aug. 18, 2011), <http://www.greentechmedia.com/articles/read/dark-day-for-solar-thermal-solar-trust-switches-500-mw-power-plant-to-pv/>.

26. See Bill Savadove, *China takes over as US solar power firms fail*, PHYSORG.COM (Sept. 18, 2011), <http://www.physorg.com/news/2011-09-china-solar-power-firms.html>.

27. JANET SAWIN ET AL., RENEWABLE ENERGY POLICY NETWORK FOR THE 21ST CENTURY, RENEWABLES 2011 GLOBAL STATUS REPORT 72 (2011), available at http://www.ren21.net/Portals/97/documents/GSR/REN21_GSR2011.pdf.

American projects may outpace that of our own government.²⁸ In 2011, a single Chinese company and its American subsidiary announced plans to invest more than \$6 billion in U.S. clean energy through 2020.²⁹ By comparison, the 111th Congress appropriated just \$4 billion to support clean energy through loan guarantees over three years.³⁰ Foreign investors' desire to invest equity in U.S.-based renewable energy projects illustrates the benefit our Internal Revenue Code (IRC) provides to equity investors that own projects, as compared to debt investors that simply earn a return on their loaned capital.³¹ The absence of a mature debt market for large-scale solar projects has led to relatively high costs for project debt, despite significant drops in the price of PV panels, labor, and the other project costs.³²

China attracted more new investment in renewable energy than any other nation in both 2009 and 2010, and over one-third of the world's total was directed to Chinese projects in 2010 alone.³³ In terms of debt, the Chinese government has extended approximately \$35 billion in credit to solar-energy companies since 2010.³⁴ China Development Bank Corp., the world's largest lender to solar companies, offered \$29 billion in credit to five Chinese PV panel manufacturers.³⁵ As of November 2011, the group had tapped just \$866 million, or less than three percent of available funds.³⁶ Tens of billions of dollars

28. See Ben Sills, *China Buries Obama's 'Sputnik' Goal for Clean-Energy Use*, BLOOMBERG (Apr. 4, 2011, 1:36 PM), <http://www.businessweek.com/news/2011-04-04/china-buries-obama-s-sputnik-goal-for-clean-energy-use.html> [hereinafter Sills, *China*].

29. *Chinese Energy Group Plans \$8 Billion in US Clean Energy Investments*, SUSTAINABLEBUSINESSNEWS.COM (Sept. 6, 2011, 9:11 AM), <http://www.sustainablebusiness.com/index.cfm/go/news.display/id/22866>.

30. See Jack Caldwell & Richard W. Caperton, *End the Raids on Clean Energy Funding*, CTR. FOR AM. PROGRESS (Aug. 11, 2010), http://www.americanprogress.org/issues/2010/08/clean_energy_raids.html; David Rogers, *State Aid Bill to Bring House Back*, POLITICO (Aug. 4, 2010), http://www.politico.com/news/stories/0810/40636_Page2.html.

31. See Roberta F. Mann, *Federal, State, and Local Tax Policies for Climate Change: Coordination or Cross-Purpose?*, 15 LEWIS & CLARK L. REV. 369, 379 (2011) ("The federal government provides greater subsidies to the energy sector through the Internal Revenue Code (IRC) than by any other means.").

32. See Tracking, *supra* note 2, at 2.

33. See MCCORONE, *supra* note 18, at 19.

34. See Sills, *China*, *supra* note 28.

35. See Sally Bakewell, *Chinese Renewable Energy Companies Slow to Tap \$47 Billion Credit*, BLOOMBERG (Nov. 16, 2011), <http://www.bloomberg.com/news/2011-11-16/chinese-renewable-companies-slow-to-tap-47-billion-credit-line.html>.

36. See *id.*

remain available to Chinese PV panel manufacturers to support the research, development, and manufacture of more efficient solar power components – continuing to push solar power toward grid parity with other power generation sources.

III. U.S. INCENTIVES REWARD EQUITY INVESTMENT

U.S. solar companies and project developers rely on two types of federal incentives: tax credits and depreciation deductions. Both reward equity investment. The 1705 Program complemented these equity incentives by guaranteeing loans to qualified solar projects, but its expiration means a key component of the renewable energy project finance equation is missing.

A. *Incentives for Equity Investment*

The IRC provides three primary tax benefits for the equity investor in a renewable energy project: (1) the Production Tax Credit (PTC),³⁷ (2) the Investment Tax Credit (ITC),³⁸ each available exclusive of the other, and (3) accelerated depreciation.³⁹ The PTC provides an income tax credit that varies according to the amount of energy produced from “qualified sources” during a ten-year period.⁴⁰ Wind power facilities are the primary recipient among the “qualified sources” eligible for the PTC, which also includes closed- and open-loop biomass and geothermal, among others.⁴¹ Solar power projects’ eligibility for the PTC expired in 2005; thus, new solar developers wishing to take advantage of federal incentives are relegated to the ITC.⁴² In addition, a non-operating owner of a renewable energy generation facility may not claim the PTC, thereby requiring a project finance structure that allows the passive equity investors to meet operating requirements.⁴³

37. 26 U.S.C. § 45 (Supp. IV 2010).

38. § 48.

39. 26 U.S.C. § 168(k) (2006).

40. *See* 26 U.S.C. § 45 (Supp. IV 2010).

41. Jerome L. Garciano, *Green Energy Tax Policies: State and Federal Tax Incentives for Renewable Energy and Energy Efficiency*, 25-SPG NAT. RESOURCES & ENV'T 12, 12 (2011).

42. § 45(d)(4).

43. § 45(d)(3)(C) (“[T]he person eligible for the credit allowable under subsection (a) shall be the lessee or the operator of such facility.”)

The ITC, the primary federal incentive for solar power development, provides an income tax credit equal to a specified percentage of the “energy property” placed in service during the taxable year.⁴⁴ Currently, the ITC is thirty percent for qualified solar facilities, fuel cells, and small wind (under 100 kilowatts), and ten percent for other qualifying “energy property.”⁴⁵ In order to take the credit, the taxpayer must either construct the solar facility or acquire ownership at the time operation commences.⁴⁶ Equity investment in utility-scale solar facilities benefits from the thirty percent credit through January 1, 2017, at which point solar projects will only be eligible for a ten percent credit.⁴⁷

In addition to the PTC and ITC, the federal government allows the recovery of equity investment in certain types of property, including solar power facilities, through depreciation deductions to taxable income.⁴⁸ The Accelerated Cost Recovery System provides a five-year depreciation schedule for solar facilities qualifying for the ITC.⁴⁹ Thus, the owner of a solar energy facility that qualifies for the ITC may write off approximately one-fifth the asset value during each of the facility’s first five years.⁵⁰ The Tax Relief, Unemployment Insurance Reauthorization, and Job Creation Act of 2010⁵¹ amended the existing

44. § 48(a). For “equipment which uses solar energy to generate electricity,” the thirty percent credit may be utilized if the construction or acquisition occurs prior to Jan. 1, 2017. *Id.*

45. *Id.* For example, a coal plant is eligible for a ten percent tax credit under the ITC. *Id.*

46. § 48(a)(3)(B); *see also* Memorandum from Cadwalader, Wickersham & Taft LLP, Investment in Alternative Energy After the End of Cash Grants, to Clients & Friends 12 (Sept. 6, 2011) [hereinafter Investment in Alternative Energy], available at http://www.cadwalader.com/assets/client_friend/090611InvestmentAlternativeEnergy.pdf (explaining that the ITC is not available to a secondary purchaser of property that is already producing energy).

47. § 48(a)(2).

48. § 168(k) (listing depreciation deductions according to property type; not specific to the renewable energy industry).

49. § 168(e)(3)(B)(vi).

50. The five-year schedule for most types of solar, geothermal, and wind property has been in place since 1986. *Federal: Incentives/Policies for Renewables & Efficiency*, DSIRE, http://www.dsireusa.org/incentives/incentive.cfm?Incentive_Code=US06F&re=1&ee=1 (last updated Oct. 14, 2011) [hereinafter DSIRE].

51. Tax Relief, Unemployment Insurance Reauthorization, and Job Creation Act of 2010 § 401, Pub. L. No. 111-312, 124 Stat. 3296, 3304 (codified as amended at 26 U.S.C. § 168 (Supp. IV 2010)).

federal depreciation provisions for solar facilities, providing that qualified property placed in service after September 8, 2010 and before January 1, 2012 qualifies for one-hundred percent bonus depreciation.⁵²

As tax-related benefits, the PTC, ITC, and depreciation deduction all require a tax burden against which each benefit may be applied.⁵³ Thus, the widespread drop in taxable corporate profits in 2008 posed a significant problem for renewable energy project development. In response to this very issue, Congress included two provisions that sustain investment in the domestic solar power industry in two broader omnibus bills. First, the Emergency Economic Stabilization Act, which President Bush signed into law on October 3, 2008, extended the ITC's thirty percent rate for solar facilities until the end of 2016.⁵⁴ Second, and perhaps more impactful, section 1603 of the American Recovery and Reinvestment Act of 2009 (ARRA), allowed renewable energy project developers the option of taking a cash grant in lieu of the ITC (Cash Grant Program).⁵⁵

According to the National Renewable Energy Laboratory (NREL), the Cash Grant Program served as the most important federal incentive for solar power in 2010 and the first half of 2011, the last period for which data is available.⁵⁶ However, the Cash Grant Program

52. *Id.*; see also DSIRE, *supra* note 50 (noting that through Dec. 31, 2011, renewable energy projects that qualify for the ITC are eligible for one-hundred percent depreciation bonus in the first year).

53. See Erin Dewey, *Sundown and You Better Take Care: Why Sunset Provisions Harm the Renewable Energy Industry and Violate Tax Principles*, 52 B.C. L. REV. 1105, 1114 (2011) (stating that tax credits allow "dollar-for-dollar reductions in income tax liability," whereas tax deductions such as depreciation reduce taxable income and thus lower tax liability).

54. See Emergency Economic Stabilization Act of 2008 §101, 26 U.S.C. § 48(a)(2)(A)(i)(II) (Supp. IV 2010); Jack Cargas, U.S. Renewable Energy Tax Equity Inv. and the Treasury Cash Grant Program 2 (U.S. P'ship for Renewable Energy Fin., White Paper, Apr. 2010), available at <http://uspref.org/white-papers>.

55. See American Reinvestment and Recovery Act of 2009 § 1603, 26 U.S.C. § 48 note (Supp. IV 2010); *Overview and Status of the §1603 Program*, U.S. DEP'T OF THE TREASURY (Jan. 18, 2011, 1:43 PM), <http://www.treasury.gov/initiatives/recovery/Pages/1603.aspx> (scroll to bottom of the page; then click hyperlink entitled "STATUS OVERVIEW").

56. See Michael Mendelsohn & Ryan Hubbell, Nat'l Renewable Energy Lab., Presentation on NREL's Renewable Energy Financial Tracing Initiative 1H 2011 Summary 48 (Sept. 29, 2011), available at http://financere.nrel.gov/finance/webfm_send/60/Q410_REFTI_Presentation_%2818_May_2011%29.pdf (showing that among survey respondents constructing PV facilities over 1 MW in size, approximately sixty percent viewed the Cash Grant Program as "extremely" important, and approximately twenty percent viewed it as "very" important).

expired on December 31, 2011, and given the legislative gridlock that typically precedes an election,⁵⁷ commentators do not expect an extension of the program prior to the 2012 elections.⁵⁸ Not to worry, as taxable corporate profits rebound, “tax equity investors”⁵⁹ will likely maintain the flow of equity investment to renewable energy projects.

B. Tax Equity Investors

Tax equity investors are passive owners of an asset or project that provides not only a return based on the asset’s cash flow but also from federal tax deductions or credits.⁶⁰ The ITC, PTC and Cash Grant Program led to more than \$4 billion in tax equity commitments to renewable energy projects in the first half of 2011, the most recent period on which data is available.⁶¹ Federal tax equity benefits often make up as much as sixty percent of a typical renewable energy project cost, and thus are critical to the solar industry’s continued progress.⁶² Until the expiration of solar power’s thirty percent ITC in 2017, profitable corporations will have a strong incentive to own or otherwise contribute equity to solar generation facilities.

57. See Charles Green & David Hess, *Congress, Bush Spar Before Election, Producing Gridlock On Legislation*, THE PHILA. INQUIRER, Oct. 6, 1991, http://articles.philly.com/1991-10-06/news/25816708_1_jobless-benefits-bush-spar-extra-benefits (“pre-election jockeying is a prescription for legislative gridlock over the next year and will reduce the already slim odds for action on such national problems”); Adam Clymer, *Congressional Memo: As Campaign Heats Up, Senate Just Stops Cold*, N.Y. TIMES, May 12, 1996, <http://www.nytimes.com/1996/05/13/us/congressional-memo-as-campaign-heats-up-senate-just-stops-cold.html?scp=1&sq=%22senate%2C+embroiled%22&st=nyt> (“The Senate, embroiled in a presidential campaign as never before, may be surpassing itself in ineffectiveness.”).

58. See CHADBOURNE & PARKE LLP, U.S. POLICY OUTLOOK FOR RENEWABLE ENERGY 2-5 (2011), available at http://www.chadbourne.com/files/Publication/54c0249b-9d5c-4c03-8d35-28a1a1a33a84/Presentation/PublicationAttachment/77e5cbd2-e0be-45de-a448-2c4e4d21153a/pfn_June11.pdf (discussing the consensus opinion by Rob Gramlich, senior vice president of public policy for the American Wind Energy Association, Greg Wetstone, vice president for governmental affairs for Terra-Gen Power, and Jon Chase, vice president of government relations at Vestas Americas that the cash grant program is unlikely to be renewed prior to 2012 elections).

59. See *infra* Part III.B.

60. Cargas, *supra* note 54, at 2.

61. *Prospective 2011-2012 Tax Equity Market Observations*, U.S. P'SHIP FOR RENEWABLE ENERGY FIN., 2, (July 2011), <http://uspref.org/wp-content/uploads/2011/07/US-PREF-Tax-Equity-Market-Observations-v2.2.pdf>.

62. Arnold E. Grant, Reed Smith LLP, Presentation on Structuring Solar Projects to Maximize Tax Subsidies (Mar. 4, 2009), available at http://www.reedsmith.com/_db/_documents/Reed_Smith_Tax_Presentation.pdf.

Tax equity investors are already returning to large-scale renewable projects en masse. In 2008, approximately twenty tax equity investors financed renewable energy projects; in 2009, as revenues slid and taxable profit disappeared, only four to six investors remained active.⁶³ As of July 2011, there were at least fifteen active tax equity investors in renewable energy,⁶⁴ including Google Inc.,⁶⁵ Citigroup Inc.,⁶⁶ US Bancorp,⁶⁷ and PG&E Corp.⁶⁸ As experienced tax equity investors return to the renewable energy market, syndicators are also introducing new private equity investors to tax equity opportunities in renewable energy.⁶⁹ Thus, solar projects should have the tools to attract equity, at least through the expiration of the ITC in 2016. Whether they can attract debt is the real key to the utility-scale solar industry going forward.

IV. SOLAR PROJECT FINANCE AND THE MISSING LENDING LINK

Despite the solar power industry's recent growth, "balance sheet financing" is possible for few of the utility-scale solar projects that

63. See PAUL SCHWABE ET AL., NAT'L RENEWABLE ENERGY LAB., RENEWABLE ENERGY PROJECT FINANCING: IMPACTS OF THE FINANCIAL CRISIS AND FEDERAL LEGISLATION, at v (2010), available at <http://www.nrel.gov/docs/fy09osti/44930.pdf>.

64. Cargas, *supra* note 54, at 2.

65. Joel Kirkland, *Cash Rich Companies Begin to Make Renewable Energy Investments*, N.Y. TIMES (Aug. 18, 2011), <http://www.nytimes.com/cwire/2011/08/18/18climatewire-cash-rich-companies-begin-to-make-renewable-e-3023.html> (citing Google's \$170 million investment in utility-scale Ivanpah solar project in 2011 as evidence of a preferential tax equity market).

66. Press Release, Sungevity, Sungevity and Citi Create New Fund for Residential Solar Projects (Aug. 15, 2011), <http://www.sungevity.com/sungevity-and-citi-create-new-fund-residential-solar-projects> (announcing Citi's creation of a renewable energy tax equity fund to support over \$50 million in new residential solar projects developed by Sungevity).

67. Press Release, SolarCity, U.S. Bancorp and SolarCity Announce New \$158 Million Fund to Finance Solar Projects (June 1, 2011), [http://www.solarcity.com/pressreleases/90/U-S-Bancorp-and-SolarCity-Announce-New-\\$158-Million-Fund-to-Finance-Solar-Projects.aspx](http://www.solarcity.com/pressreleases/90/U-S-Bancorp-and-SolarCity-Announce-New-$158-Million-Fund-to-Finance-Solar-Projects.aspx).

68. The northern California utility holding company PG&E created the \$100 million Pacific Energy Capital II fund to finance residential solar installations with SunRun. This follows PG&E's Pacific Energy Capital I, a \$60 million tax equity fund created for investment with SolarCity in January 2010. See Todd Woody, *A \$100 Million Pool for Solar Financing*, N.Y. TIMES GREEN BLOG (June 21, 2010, 7:20 AM), <http://green.blogs.nytimes.com/2010/06/21/a-100-million-pool-for-solar-financing/>.

69. Elisa Wood, *Post-stimulus Financing: Will Renewable Growth Continue?*, RENEWABLEENERGYWORLD.COM (Aug. 16, 2011), <http://www.renewableenergyworld.com/rea/news/article/2011/08/post-stimulus-financing-will-renewable-growth-continue>.

often require hundreds of millions of dollars in capital investment.⁷⁰ Usually, poorly-capitalized project developers⁷¹ and risk-averse utilities cannot develop renewable energy generation projects alone.⁷² Therefore, utility-scale solar projects depend on “project finance” structures to fund development, making lenders an integral part of the process.⁷³ Two particular structures, the “flip” partnership and the sale-leaseback, allow developers, as opposed to an investor-owned utility or other power purchaser, to shoulder the risk through the early stages of the project.⁷⁴ Equally as important, project finance structures also allow the passive equity investor to capture the appropriate federal tax credit and accelerated depreciation.⁷⁵

A. *Solar Project Finance Structures*

The “flip” partnership requires the equity investor and the project developer to form a partnership, or limited liability company taxed as a partnership, that will develop, own and operate the renewable

70. See MARK BOLINGER, FINANCING NON-RESIDENTIAL PHOTOVOLTAIC PROJECTS: OPTIONS AND IMPLICATIONS, LAWRENCE BERKELEY NAT'L LAB. ii (2009), available at <http://eetd.lbl.gov/ea/ems/reports/lbnl-1410e.pdf> (noting that projects hoping to proceed using balance sheet finance will face many barriers, including “high up-front costs, a steep learning curve for a non-core business function, technology and performance risk, and a potential inability to make efficient use of the project’s [tax benefits]”).

71. See Uclia Wang, *The Numbers Game*, PV MAGAZINE, June 2010, at 32, available at [http://www.pv-magazine.com/archive/articles/beitrag/the-numbers-game-_100000962/86/?tx_ttnews\[backCat\]=128&cHash=01d0f9b163de7c60e305afclac34bc90](http://www.pv-magazine.com/archive/articles/beitrag/the-numbers-game-_100000962/86/?tx_ttnews[backCat]=128&cHash=01d0f9b163de7c60e305afclac34bc90) (explaining that many “poorly capitalized developers” underestimate the “hefty investment” required during the early stages of solar power project development).

72. Katie Fehrenbacher, *Smart Grid 101: Utilities Are Very Risk Averse*, GIGAOM (Jan. 24, 2010, 6:26 PM), <http://gigaom.com/cleantech/smart-grid-101-utilities-are-very-risk-averse/>.

73. “Project finance” is one way to fund a project that depends not on the creditworthiness of the borrowers or value of the underlying asset, but on the project’s ability to repay the debt through cash flows at a rate consistent with the project’s risk. A project finance deal is defined by five key components: (1) the debtor is a special-purpose vehicle (SPV), typically created by sponsor equity and mezzanine debt, which is financially and legally independent of the sponsors; (2) lenders have only limited recourse to the sponsors; (3) project risks are allocated equitably among all parties in the transaction; (4) cash flows generated by the SPV are sufficient to cover operating costs and service the debt in terms of both capital repayment and interest; (5) collateral is given by sponsors as security for receipts and assets used to manage the project. STEFANO GATTI, PROJECT FINANCE IN THEORY AND PRACTICE 2 (2008).

74. Investment in Alternative Energy, *supra* note 46, at 1.

75. See *infra* Part IV.A.

energy facility.⁷⁶ Typically, the partnership then allocates 99% of its taxable income (or loss) and 99% of the associated tax credits, to the equity investor, with the remaining income/loss and credits allocated to the developer.⁷⁷ Upon completion of the project, cash distributions from operations are usually split, with 99% accruing to the equity investor and 1% to the developer.⁷⁸ After the equity investor has received its targeted return, the “flip” in allocation typically occurs such that approximately 95% of distributions accrue to the developer and 5% to the investor.⁷⁹ Following the flip, which typically occurs concurrently with the expiration of the tax credits, the developer often has an option to purchase the investor’s interest in the project for fair market value.⁸⁰

Unlike the “flip,” the sale-leaseback structure allows a solar project to proceed in the absence of developer capital, with one-hundred percent financing of the equity contributed by passive equity investors. The sale-leaseback project structure requires that the equity investor purchase the energy generation facility no more than ninety days after it was originally placed in service.⁸¹ Typically, the investor uses a combination of equity and non-recourse debt to finance the purchase, with the equity component required to comprise at least twenty percent of the capitalized cost of the facility for the IRS to recognize the tax benefit.⁸² The investor then leases the facility back to the developer to operate and maintain for a term that may not exceed eighty percent of the facility’s useful life, generally as determined by an independent

76. Investment in Alternative Energy, *supra* note 46, at 1.

77. *Id.* at 2 (noting that Revenue Procedure 2007-45 IRB 967 provides a safe harbor for a “flip” partnership and requires, among other things, that the developer has a minimum one percent interest in the partnership’s income/loss, deduction and tax credits at all times during the partnership’s existence, the equity investor has exposure to material income and gain items equal to at least five percent of equity investment, minimum equity percentages by equity partner, etc.).

78. *Id.*

79. *Id.*

80. *See id.* The taxpayer may claim an inflation-adjusted tax credit per kilowatt hour of electricity produced for a “10-year period beginning on the date the facility was originally placed in service” 26 U.S.C. § 45(a)-(b) (2006).

81. Investment in Alternative Energy, *supra* note 46, at 3 (explaining that safe harbor requirements include: equity investor makes and maintains at least twenty percent equity investment of capitalized cost of lease facility, term of lease does not exceed eighty percent of economic life of leased facility, at end of lease term the expected value of facility is equal to at least twenty percent of original capitalized cost).

82. *Id.*

appraiser or engineer.⁸³ In order for the equity investor in a sale-leaseback arrangement to claim ownership, and the tax credits that accrue to the owner, the arrangement must be a “true lease” for federal income tax purposes.⁸⁴ Investors may meet this standard by complying with the safe harbor in IRS Revenue Procedure 2001-28.⁸⁵

B. Domestic Lending Shortfall

A small number of European banks have traditionally dominated global renewable energy project lending.⁸⁶ In particular, German commercial banks lead the world in providing debt for renewable energy project finance.⁸⁷ Of the roughly \$78 billion in solar energy project financing that occurred in 2010, forty-five percent of it occurred in Germany.

Despite increasing U.S. demand for solar projects, domestic lenders remain “years behind their European counterparts.”⁸⁸ More recently, U.S. banks have been “eyeing renewable energy projects,” and as one financier notes, “if the developer offers a financeable project, the lender will be there.”⁸⁹ According to these lenders, a “financeable” project includes proven technology (such as PV, wind turbines, and geothermal), contracts with established manufacturers and contractors, and perhaps most importantly, a power purchase agreement (PPA) with a reliable buyer.⁹⁰ A PPA is a long-term contract, typically lasting for ten or twenty years, to buy energy at a fixed price from a specific source.⁹¹ The customer may be anyone, but it appears lenders prefer

83. *Id.*

84. *Id.*

85. See Rev. Proc. 2001-28, 2001-19 I.R.B. 1156 (stipulating that a lease for federal income tax purposes must meet “[m]inimum unconditional ‘at risk’ investment” by the lessor, contain certain lease term and renewal requirements, meet requirements for purchase and sale rights, and meet a number of other guidelines); Investment in Alternative Energy, *supra* note 46, at 4 (listing the “key” requirements of Revenue Procedure 2001-28).

86. PAUL SCHWABE ET AL., NAT’L RENEWABLE ENERGY LAB., RENEWABLE ENERGY PROJECT FINANCE: IMPACTS OF THE FINANCIAL CRISIS AND FEDERAL LEGISLATION 6 (2010), available at <http://www.nrel.gov/docs/fy09osti/44930.pdf>.

87. See Wood, *supra* note 69.

88. Matt Daily & Nichola Groom, *U.S. Solar Growth Hinges on Big Cash Infusions*, REUTERS (Mar. 3, 2011, 4:19 PM), <http://www.reuters.com/article/2011/03/03/us-solar-financing-idUSTRE7227AW20110303>.

89. Wood, *supra* note 69.

90. *Id.*

91. See Marc Gunther, *For solar energy, the future looks bright*, FORTUNE (Oct. 4,

PPAs with institutional, low-risk buyers such as Wal-Mart Stores, Inc. or investor-owned utilities, both of which regularly contract to buy solar power.⁹²

Despite customer-demand typically fixed by contract for twenty years, domestic banks are reticent to lend to solar projects because they “just don’t like to go long on debt.”⁹³ Furthermore, many commercial banks do not have the appetite or experience to support utility-scale solar projects.⁹⁴ For example, even with a \$1.6 billion federal loan guarantee, BrightSource Energy, Inc.’s massive Ivanpah solar energy facility relied on debt financing from the Federal Financing Bank, as opposed to a private lender.⁹⁵ The lack of domestic lending poses a significant obstacle for utility-scale solar facilities that, like other infrastructure projects, require long-term financing over the entire period covered by the PPA. The best way to convince domestic lenders to “go long” on utility-scale solar project debt is for the federal government to provide a safety net through the provision of loan guarantees. From 2009 to 2011, during the administration of the federal loan guarantee program, domestic bank lending increased as solar projects generated higher than expected returns.⁹⁶

2007, 3:33 AM), http://money.cnn.com/2007/10/03/news/companies/sunpower_solar.fortune/index.htm.

92. *Id.*

93. See Daily & Groom, *supra* note 88; Matt Daily & Sara McBride, *Analysis: U.S. solar-sector growth hinges on financing quest*, REUTERS (Oct. 17, 2010, 6:05 PM), <http://www.reuters.com/article/2010/10/17/us-solar-financing-analysis-idUSTRE69G1M820101017> (“Bankers generally prefer smaller, less risky projects and shorter-term loans than the 20-year terms solar plants typically need.”).

94. Terrance Murray, *Details on NRG Energy’s \$300M Ivanpah Investment*, GREEN ENERGY REPORTER (Oct. 27, 2010, 3:51 PM), <http://www.greenenergyreporter.com/renewables/solar/details-nrg-energys-300m-ivanpah-investment/>. The CEO of solar thermal system designer and developer BrightSource explained that the DOE loan guarantee is critical since he “doubts” commercial banks have the appetite to support billion dollar renewable energy projects following the 2008 downturn. *Id.*

95. Uclia Wang, *BrightSource Raises Another \$26M, IPO for 2011?*, GIGAOM (Sept. 27, 2010, 12:16 PM), <http://gigaom.com/cleantech/brightsource-raises-another-26m-ipo-for-2011/>.

96. See Daily & Groom, *supra* note 88 (offering the view of a senior executive at Sharp Solar Energy Solutions Group that higher than expected returns have caused lenders to grow “more comfortable with solar technology”).

V. THE “OLD” LOAN GUARANTEE PROGRAMS

A. *Section 1703 and Section 1705 Loan Guarantee Programs*

In the EAct, Congress defines a “loan guarantee” as “any guarantee, insurance, or other pledge with respect to the payment of all or a part of the principal or interest on any debt obligation of a non-Federal borrower to a non-Federal lender”⁹⁷ The EAct empowers the Secretary of Energy, after consulting with the Secretary of Treasury, to make loan guarantees for qualified renewable energy projects and with the appropriate terms and conditions.⁹⁸ In the event a developer defaults on its federally guaranteed debt, the holder of the loan guarantee has the right to demand payment of the unpaid amount from the Secretary of Energy.⁹⁹ From 2009 through 2011, the DOE administered two different federal loan guarantee programs. While one was permanent and the other temporary, both purported to support domestic clean energy.¹⁰⁰

Congress established the permanent loan guarantee program under section 1703 of the EAct for projects that “avoided, reduced or sequestered air pollutants” *and* employed “new or significantly improved technologies as compared to commercial technologies.”¹⁰¹ Projects that avoided air pollutants using “technology in general use in the commercial marketplace,” such as PV and wind turbines, were therefore not eligible for the loan guarantees under Section 1703.¹⁰² The 1703 loan program remains in place today and since 2009 has conditionally committed approximately \$11 billion in guarantees across four projects, including \$8.3 billion for the construction and operation

97. 2 U.S.C. § 661a(3) (2006).

98. Requirements include: the loan guarantee “shall not exceed an amount equal to 80 percent of the project cost,” there must be a “reasonable prospect of repayment of principle and interest,” the “obligation shall be subject to condition that the obligation is not subordinate to other financing,” “interest at a rate that does not exceed a level that the Secretary determines appropriate, taking into account the prevailing interest in the private sector for similar loans and risks,” and “full repayment over a period not to exceed the lesser of—(1) 30 years; or (2) 90 percent of the projected useful life of physical asset to be financed,” among others. *See* 42 U.S.C. § 16512 (2006).

99. *Id.*

100. 42 U.S.C. §§ 16511-16 (Supp. IV 2010).

101. *Id.* § 16513.

102. *See id.*

of two new reactors at Georgia Power Company's Vogtle nuclear power plant.¹⁰³

In 2009, Congress created the 1705 Program: a second, temporary loan guarantee program "for [the] rapid deployment of renewable energy and electric power transmission projects[.]"¹⁰⁴ Section 406 of the ARRA amended Title XVII of the EPAct to include the additional section 1705, which, unlike section 1703, provided for guarantees to projects utilizing commercial technologies.¹⁰⁵ Additionally, Congress appropriated \$4 billion to pay the costs of implementing the 1705 Program.¹⁰⁶

B. Past Successes of 1705 Program

The 1705 Program facilitated a leveraged approach to renewable energy development that provided an estimated ten dollars in loan guarantees for every dollar appropriated to the program.¹⁰⁷ Even with a thirty-three percent funding cut,¹⁰⁸ the 1705 Program was extremely successful; from September 2009 through September 2011, the DOE dispersed roughly \$12 billion in loan guarantees for solar power generation projects.¹⁰⁹ Four of the five largest PV farms in the world are under development in the United States at least in part thanks to the 1705 Program.¹¹⁰

103. See *Our Projects*, U.S. DEP'T OF ENERGY LOAN PROGRAMS OFFICE, https://lpo.energy.gov/?page_id=45 (last visited Feb. 7, 2012), for a list of projects receiving loan guarantees. But see Fred Sissane et al., CONG. RESEARCH SERV., R40414, ENERGY PROVISIONS IN THE AMERICAN RECOVERY AND REINVESTMENT ACT OF 2009 (P.L. 111-5) 11 n.33 (2009) (noting the sluggish rate at which loan guarantees were awarded under the Section 1703 Program and specifically citing that in the first four years of the program's existence "no guarantees had been awarded to any type of technology").

104. American Recovery and Reinvestment Act of 2009 § 406, 42 U.S.C. § 16511-16 (Supp. IV 2010). Title XVII of the Energy Policy Act of 2005, 42 U.S.C. § 16511 et seq., was amended by adding 42 U.S.C. § 16516. *Id.*

105. *Id.*

106. *House Jobs Bill Would Restore \$2 Billion For Loan Guarantees, Makes Other Changes*, 93 Banking Rep. (BNA) No. 1238 (Dec. 22, 2009) (explaining that of the \$6 billion Congress allocated to the loan guarantee program, \$2 billion was reallocated to pay for the "Cash for Clunkers" program).

107. *Id.*

108. *Id.*

109. BROWN, *supra* note 8, at 1.

110. See *Largest Photovoltaic Solar Farms – Are they Advantageous over Distributed Rooftop Solar and Why Utilities Love Them*, GREEN WORLD INVESTOR (Mar. 5, 2011), <http://www.greenworldinvestor.com/2011/03/05/largest-photovoltaic-solar-farms-are-they->

American lenders demonstrated the importance of the program on its final day before expiration.¹¹¹ On September 30, 2011, the DOE confirmed loan guarantees to three utility-scale solar generation projects: First Solar's 550 Megawatts (MW) Desert Wind¹¹² and 230 MW Antelope Valley Solar Ranch One projects,¹¹³ and SunPower Corp.'s 250 MW California Valley Solar Ranch project.¹¹⁴ Coincident with the federal loan guarantees, Goldman Sachs and Citigroup, and the Treasury-run Federal Financing Bank announced they would provide debt financing to the Desert Wind and Antelope Valley projects, respectively.¹¹⁵ The dominoes continued to fall, as all three projects sold that same day.¹¹⁶ Over \$3 billion in financing went firm and more than 1000 MW of future energy generation capacity changed hands in a matter of hours as a direct result of the loan guarantees.¹¹⁷

Outside the United States, loan guarantee programs have successfully stimulated investment in strategically-important infrastructure. For example, in 2008, France instituted €8 billion in guarantees to support high-speed train development, which kept more than €20 billion in projects on track.¹¹⁸ Unfortunately, the 1705

advantageous-over-distributed-rooftop-solar-and-why-utilities-love-them/.

111. See *infra* notes 112-17 and accompanying text.

112. Press Release, First Solar, Inc., First Solar Sells 550-Megawatt Desert Sunlight Solar Farm, Among World's Largest (Sept. 30, 2011), <http://investor.firstsolar.com/releasedetail.cfm?ReleaseID=610018> [hereinafter Desert Sunlight].

113. Press Release, First Solar, Inc. Exelon to Expand its Clean Energy Fleet with Acquisition of 230-Megawatt Solar Photovoltaic Project from First Solar (Sept. 30, 2011), <http://investor.firstsolar.com/releasedetail.cfm?ReleaseID=609723> [hereinafter Exelon].

114. News Release, SunPower Corp., NRG Energy Completes Acquisition of 250-Megawatt California Valley Solar Ranch from SunPower (Sept. 30, 2011), <http://www.prnewswire.com/news-releases/nrg-energy-completes-acquisition-of-250-megawatt-california-valley-solar-ranch-from-sunpower-130876833.html> [hereinafter NRG].

115. See Desert Sunlight, *supra* note 112; Exelon, *supra* note 113.

116. See Desert Sunlight, *supra* note 112 (highlighting the sale of Desert Wind to affiliates of NextEra Energy Resources, LLC and GE Energy Financial Services, with each owning a fifty percent stake in the project); Exelon, *supra* note 113 (highlighting the sale of Antelope Valley Solar Ranch One to Exelon); NRG, *supra* note 114.

117. See Desert Sunlight, *supra* note 112; Exelon, *supra* note 113; NRG, *supra* note 114.

118. See CHADBOURNE & PARKE LLP, *Outlook for Private Investment in US Infrastructure*, PROJECT FIN. NEWswire, at 24, 31 (Keith Martin ed., June 2011), available at http://www.chadbourne.com/files/Publication/54c0249b-9d5c-4c03-8d35-28a1a1a33a84/Presentation/PublicationAttachment/77e5cbd2-e0be-45de-a448-2c4e4d21153a/pfn_June11.pdf (quoting comments of Fadi Selwan, chief operating officer of VINCI Concessions / Development, an international developer of infrastructure).

Program's successes have been overshadowed by its most notable failure – the bankruptcy of loan guarantee recipient Solyndra LLC (Solyndra).

C. *The Solyndra Bankruptcy*

On September 4, 2009, the DOE announced that it had finalized a \$535 million loan guarantee to Solyndra.¹¹⁹ It was the first loan guarantee under the 1705 Program.¹²⁰ Almost exactly two years later, on September 1, 2011, Solyndra announced, “it was ceasing operations, laying of [sic] 1,100 workers and preparing to file for bankruptcy protection.”¹²¹ Solyndra manufactured slightly more efficient PV “tubes” (as opposed to panels), and when prices on traditional PV panels dropped forty percent, Solyndra’s technology was not competitive.¹²² The immediate result of Solyndra’s bankruptcy was widespread criticism of the federal loan program as a whole; pundits from across the political spectrum pointed to the loan guarantee program as another example of ineffective stimulus of private industry.¹²³ During a September 14, 2011, Congressional hearing, Republicans and Democrats came together to agree that the DOE’s loan guarantee to Solyndra was a bad decision.¹²⁴

119. *Solyndra Inc.*, U.S. DEP’T OF ENERGY LOAN PROGRAMS OFFICE, <https://lpo.energy.gov/?projects=solyndra-inc> (last visited Jan. 23, 2012).

120. Neela Banerjee, *Official Involved in Solyndra Loan Guarantee Resigns*, L.A. TIMES (Oct. 7, 2011), <http://articles.latimes.com/2011/oct/07/nation/la-na-obama-solyndra-20111007>.

121. Ronald D. White, *Solar Panel Firm Solyndra to Cease Operations*, L.A. TIMES (Sept. 1, 2011), <http://articles.latimes.com/2011/sep/01/business/la-fi-solar-shutdown-20110901>.

122. See *supra* Section II.

123. See e.g., Anne C. Mulkern, *Solyndra Bankruptcy Reveals Dark Clouds in Solar Power Industry*, N.Y. TIMES (Sept. 6, 2011), <http://www.nytimes.com/gwire/2011/09/06/06greenwire-solyndra-bankruptcy-reveals-dark-clouds-in-sol-45598.html?pagewanted=all>; Gloria Gonzalez, *Solyndra Backlash Risks Hobbling US Clean Energy Sector*, ENVTL. FIN. (Oct. 6, 2011), <http://www.environmental-finance.com/news/view/2027>.

124. See Memorandum from the Comm. on Energy and Commerce on The Solyndra Story (Sept. 14, 2011), available at <http://republicans.energycommerce.house.gov/Media/file/Hearings/Oversight/091411/Solyn draStoryFinalMemo.pdf> (“[D]OE and OMB did not take adequate steps to protect taxpayer dollars. Emails and communications produced to the Committee show that DOE and OMB staff repeatedly questioned whether the company had the financial resources to support the operations of the loan guarantee project”); *Solyndra Cancels IPO Plans, Instead Sells Debt*, BLOOMBERG BUSINESSWEEK (June 18, 2010, 7:34 AM).

While politicians point to a loan guarantee program rife with “cronyism” as the impetus behind Solyndra’s failure,¹²⁵ a more careful analysis reveals two procedural errors that doomed the Solyndra transaction. First, the Secretary of the DOE agreed to subordinate the federal loan guarantee’s first lien claim on Solyndra’s assets to a subsequent \$75 million credit agreement from private investors.¹²⁶ In doing so, the DOE violated its own rule that forbid the loan guarantee obligation from being subordinated to other financing, though allowing for *pari-passu*¹²⁷ lending at the discretion of the Secretary.¹²⁸ Second, the DOE and Office of Management of Budget (OMB) appeared to accelerate the review process, granting Solyndra preliminary loan guarantee approvals while skipping the “mandatory evaluations of the financial and engineering viability of the projects.”¹²⁹

These now politically-charged procedural issues overshadowed a deeper, though simpler, structural error in the 1705 Program, namely, that the DOE was encouraged to guarantee loans to immature start-up companies with the same frequency and terms as those offered to energy generation facilities utilizing mature PV and other renewable energy technologies. In effect, the funds unnaturally accelerated the evolution of a start-up company.¹³⁰ Furthermore, Congress failed to

<http://www.businessweek.com/ap/financialnews/D9GDLJAG0.htm> (discussing Solyndra’s 2009 cancelled initial public offering).

125. See Solyndra Loan ‘Crony Capitalism at Its Worst,’ *GOP Rep Says*, FOX NEWS (Sept. 18, 2011), <http://www.foxnews.com/politics/2011/09/18/solyndra-loan-crony-capitalism-at-its-worst-republican-says/> (quoting Rep. Senator Paul Ryan) (referring to the Solyndra loan guarantee as “crony capitalism at its worst”).

126. See Eric Lipton & John M. Broder, *In Rush to Assist a Solar Company, U.S. Missed Signs*, N.Y. TIMES, Sept. 22, 2011, at A1; Jim Snyder, *Solyndra’s Refinancing Would Have Given U.S. a 40% Stake*, BLOOMBERG (Nov. 3, 2011, 6:39 PM), <http://www.bloomberg.com/news/2011-11-03/solyndra-s-refinancing-would-have-given-u-s-a-40-stake.html> (“A deal between the Energy Department and Solyndra in February [2011] put taxpayer debt behind \$75 million in private investment in case of liquidation.”).

127. Referring to an arrangement in which creditors share equally and according to their fractional interest in recovering funds during bankruptcy proceedings. *Pari-passu*, INVESTOPEDIA, <http://www.investopedia.com/terms/p/pari-passu.asp#axzz1diJlwmNC> (last visited Nov. 3, 2011).

128. See 74 Fed. Reg. 63544, 63545 (Dec. 4, 2009) (to be codified at 10 C.F.R. pt. 609) (“First, it should be borne in mind that nowhere does section 1702 itself require that the Secretary receive a first lien on all project assets as a condition of his ability to make a loan guarantee. Instead the statute requires only that the Secretary’s guaranteed obligation ‘not be subordinate to other financing.’”).

129. Lipton & Broder, *supra* note 126.

130. See Ronnie Greene & Matthew Mosk, *‘Connected’ Energy Firm Got Lowest Interest Rate on Government Loan*, ABC NEWS (Sept. 7, 2011),

prescribe an effective method to mitigate the operational and technological risks inherent in lending hundreds of millions of dollars to immature businesses. Where a private lender would typically seek either an equity stake in the start-up or an above market interest rate, the federal government chose neither, apparently willing to subjugate taxpayer welfare for job creation.

However, a loan guarantee program supporting America's transition to renewable energy need not expose taxpayer funds to the risks inherent in "picking winners and losers" by guaranteeing loans to unproven technology manufacturers like Solyndra.¹³¹

VI. THE PATH FORWARD: A NEW LOAN GUARANTEE PROGRAM

In total, the Loan Program Office (LPO) awarded approximately \$17 billion in loan guarantees under the 1705 Program, eighty-two percent of which went to support two types of solar projects: manufacturing facilities and power generation facilities.¹³² Both project types clearly serve the solar power industry; however, a program that provides loan guarantees to emerging technology manufacturing businesses like Solyndra and commercially-proven generation projects under the same system runs counter to private sector lending conventions and obfuscates the programs' stated mission to cost-effectively support the construction of renewable, clean energy.¹³³ With

<http://abcnews.go.com/Blotter/solyndra-lowest-interest-rate/story?id=14460246> (explaining that the loans to Solyndra came with "advantageous terms in spite of red flags" such as a B+ grade from one rating agency and a "fair" grade from Dun & Bradstreet); Jeff St. John, *China's Solar Loans Still Mostly Untapped*, GREENTECHSOLAR (Nov. 17, 2011), <http://www.greentechmedia.com/articles/read/chinas-solar-loans-still-mostly-untapped/> (presenting evidence that China's loans to solar manufacturers are reported to be changing interest in the 4-5% range, much higher than loans to Solyndra).

131. See Jim Snyder, *Republicans Use Solyndra to Bash Obama's Plan*, BLOOMBERG (Sept. 15, 2011), <http://www.bloomberg.com/news/2011-09-15/republicans-use-solyndra-to-bash-obama-s-plan.html> (quoting Rep. Mike Pompeo) ("This is exactly what we get when the federal government tries to put money into businesses and tries to pick winners and losers . . .").

132. See BROWN, *supra* note 8, at 1.

133. *Our Mission*, U.S. DEPT. OF ENERGY LOAN PROGRAMS OFFICE, https://lpo.energy.gov/?page_id=17 (last visited Nov. 11, 2011) ("The mission of [the Loan Programs Office] is to accelerate the domestic commercial deployment of innovative and advanced clean energy technologies at a scale sufficient to contribute meaningfully to the achievement of our national clean energy objectives—including job creation; reducing dependency on foreign oil; improving our environmental legacy; and enhancing American competitiveness in the global economy of the 21st century.").

only minor amendments to the now expired 1705 Program, a new loan guarantee program restricted to solar energy *generation* facilities will not only promote lending to utility-scale solar projects, but also (A) eliminate much of the previous program's risk exposure, (B) create jobs, and (C) stimulate technological progress.

A. Reduced Risk

According to the Congressional Research Service, "solar manufacturing projects are generally considered higher risk than solar generation projects because the latter can use contractual mechanisms to reduce market, project, and financial risks."¹³⁴ Energy generation projects typically allow for more flexibility on the part of the developer to protect taxpayer investment, since the goal is not deployment or manufacture of a specific technology but rather the cost-effective construction of renewable energy. In 2010 and 2011, solar developers switched nine projects, amounting to more than 4,500 MW in generating capacity, from solar thermal technology to cheaper PV.¹³⁵ In August 2011, Solar Trust of America announced that the Blythe Solar Power Project was switching from CSP to PV technology for its first phase of construction, which required the project to forfeit \$2.1 billion loan guarantees.¹³⁶ Thus, a new loan guarantee program restricted to solar power generation projects takes advantage of the project developers' and Congress' shared interest to construct cost-effective solar power with the most efficient technology.

A generation-focused guarantee program will also keep the federal government out of the business of making bets on specific technologies.¹³⁷ In the final tally, DOE's losses on Solyndra will pale in comparison to those of private investors; venture capital (VC) firms invested more than \$1 billion in the company, making Solyndra possibly "the largest VC loss ever."¹³⁸ However, in contrast to the DOE

134. See BROWN, *supra* note 8, at 6.

135. Sills, *Solar Panels*, *supra* note 20, at 65.

136. Kanellos, *supra* note 25.

137. Lipton & Broder, *supra* note 127 (quoting Damien Lavera, a DOE spokesman) ("We did the analysis on our own and decided [the Solyndra loan guarantee] was a good bet.").

138. See Jennifer Kho, *What the Solyndra Bankruptcy Means for Clean Tech Investors*, FORBES (Sept. 23, 2011, 10:08 PM),

Loan Programs Office, VC investors owned an equity interest that would have permitted them to share in Solyndra's profit had the company been successful. Commentators express a legitimate concern that loan guarantees subject taxpayers to only the most risky loans that private industry is unwilling to underwrite.¹³⁹ In addition, legislators correctly attacked the provision of loan guarantees to unproven technology companies, questioning whether the government is qualified to act as a venture capitalist.¹⁴⁰ A new loan guarantee program restricted to proven renewable generation projects addresses these concerns by limiting the government's role in the choice of technology decision, and incentivizing the developer to construct the facility using the most cost-effective manner possible.

B. Job Creation

The 2008 financial downturn, and President Obama's need to jumpstart the economy, led the executive branch to rebrand its support for renewable energy as a job creation mechanism.¹⁴¹ For example, in September 2011, the Export-Import Bank of the United States guaranteed \$455 million in commercial loans to two solar projects in Ontario, Canada, under the theory that the projects will create an estimated 550 jobs in First Solar Inc.'s Ohio manufacturing facility.¹⁴² The executive branch need not look to manufacturing alone for job creation.

<http://www.forbes.com/sites/jenniferkho/2011/09/23/solyndra-bankruptcy-impact-cleantech-investing/>; Katie Fehrenbacher, *Solyndra Could be the Biggest VC Loss in History*, GIGAOM (Sept. 1, 2011, 10:26 AM), <http://gigaom.com/cleantech/solyndra-could-be-the-biggest-vc-loss-in-history/>.

139. Lisa Margonelli, *How the U.S. Can Be Effective – Room for Debate*, N.Y. TIMES (Oct. 28, 2011, 10:43 AM), <http://www.nytimes.com/roomfordebate/2011/09/20/why-isnt-the-us-a-leader-in-green-technology/how-government-can-stimulate-green-technology> (arguing that when it the government lends to fledgling businesses, it runs the risk of supporting overly risky projects, and thus should stick to its "supporting basic research" and fostering an environment in which private investors, not taxpayers, provide capital to grow companies).

140. Snyder, *supra* note 131.

141. See *Barack Obama's Plan to Create 5 Million New Green Jobs*, BARACKOBAMA.COM (2008), http://obama.3cdn.net/eff0ff1daa8baf984_4yjqmv8j3.pdf.

142. Press Release, First Solar, Inc., Ex-Im Bank Announces Over \$455 Million in Project Financing for First Solar's Exports to Canada (Sept. 2, 2011), <http://investor.firstsolar.com/releasedetail.cfm?releaseid=603219>.

A new loan guarantee program for renewable energy generation projects will directly address both Congress' desire to create jobs and the stated purpose of the previous 1705 Program to "encourage commercial use in the United States of new or significantly improved energy-related technologies and to achieve substantial environmental benefits."¹⁴³ The Alliance for American Manufacturing, in conjunction with the Political Economy Research Institute, released a 2009 study, aptly titled *How Infrastructure Investments Supports the U.S. Economy: Employment, Productivity and Growth*. The authors' research demonstrates that a \$1 billion infrastructure investment creates twenty-two percent more jobs than an equal increase in consumer spending generated by tax cuts.¹⁴⁴ Thus, not only will a loan guarantee program have the obvious effect of promoting lending, it will encourage domestic job growth.¹⁴⁵

C. Technological Progress

A new loan guarantee program facilitates technological innovation by creating demand for more efficient, cost-effective solar panels irrespective of the technology. The market, not Congress or the DOE, picks winners. For example, the \$90.6 million loan guarantee under the 1705 Program to Cogentrix of Alamosa, LLC will support the construction of "one of the first utility-scale, high concentration photovoltaic [(HCPV)] energy generation facilities in the nation and, when completed, the largest of its kind in the world."¹⁴⁶ Whereas a manufacturer of HCPV technology would face a multitude of hard-to-mitigate market and operational risks, a single energy generation facility like Cogentrix's may use contractual mechanisms to mitigate some of

143. U.S. DEP'T. OF ENERGY, ENVIRONMENTAL ASSESSMENT FOR THE DEPARTMENT OF ENERGY LOAN GUARANTEE TO COGENTRIX OF ALAMOSA, LLC FOR CONSTR. OF THE COGENTRIX SOLAR PROJECT NEAR ALAMOSA, COLO. i (Apr. 2011), *available at* <http://energy.gov/sites/prod/files/EA-1839-FEA-2011.pdf>.

144. James Helntz et al., *How Infrastructure Investments Supports the U.S. Economy: Employment, Productivity and Growth*, POLITICAL ECON. RESEARCH INST. & ALLIANCE FOR AM. MFG. 3 (2009), http://www.americanmanufacturing.org/files/peri_aam_finaljan16_new.pdf.

145. *See id.*

146. Press Release, Cogentrix Energy LLC, Department of Energy Finalizes \$90.6 Million Loan Guarantee to Cogentrix of Alamosa, LLC to Support Colorado Solar Project (Sept. 9, 2011), <http://www.cogentrix.com/news.aspx?id=13>.

those same risks.¹⁴⁷ With a new loan guarantee program focused on generating renewable energy as opposed to supporting a specific technology, the LPO refrains from breathing life into inefficient, noncompetitive solar power generating technologies.

Case in point is Stirling Energy Systems (SES), an Arizona-based manufacturer of solar power technology that was unable to obtain a federal loan guarantee for either its projects or manufacturing facilities and entered bankruptcy in September 2011.¹⁴⁸ SES's unique technology,¹⁴⁹ like Solyndra's, became prohibitively expensive¹⁵⁰ as PV prices dropped in 2010 and 2011, and SES faced the same struggles as Solyndra to find third party financing.¹⁵¹ Projects originally specifying SES technology shifted to the more cost-efficient PV technology, actually decreasing the cost of those projects.¹⁵² Loan guarantees restricted to energy generation, as opposed to technology manufacture, allow the developer flexibility to evaluate market prices and trends to choose whichever generating technology will most efficiently serve the project's needs. Again, Congress' goal of generating cheap, reliable renewable energy is thereby aligned with that of the developer, who stands to profit from the most cost efficient choice.

147. See BROWN, *supra* note 8, at 6.

148. Jennifer Runyon, *Solar Shakeout Continues: Stirling Energy Systems Files for Chapter 7 Bankruptcy*, RENEWABLEENERGYWORLD.COM (Sept. 28, 2011), <http://www.renewableenergyworld.com/rea/news/article/2011/09/solar-shakeout-continues-stirling-energy-systems-files-for-chapter-7-bankruptcy>.

149. Uclia Wang, *Stirling Redesigns Suncatcher, Plans 1.5 MW Demo Project*, GREENTECHSOLAR (June 23, 2009), <http://www.greentechmedia.com/articles/read/stirling-energy-systems-redesigns-suncatcher-plans-for-1.5mw-demo-project/> (explaining that the SES technology uses a large parabolic dish of mirrors (40 feet across) to concentrate the sun onto a receiver housing hydrogen gas filled tubes, and the heated gas runs a four-cylinder Stirling engine that drives a generator to produce electricity).

150. *Solar One Calico Project*, U.S. DEP'T OF THE INTERIOR BUREAU OF LAND MGMT., http://www.blm.gov/ca/st/en/fo/barstow/solar_one_calico.html (last updated Sept. 8, 2011) (noting that Calico Solar, LLC originally planned to build a 663 MW solar project with SES's SunCatcher technology, but subsequently switched approximately 500 megawatts of the project to PV panels as prices declined).

151. See Sara Mitchell, *Former Calico Manufacturer Declares Bankruptcy*, DESERT DISPATCH (Oct. 2, 2011, 9:00 AM), <http://www.desertdispatch.com/news/solar-11679-project-energy.html> (noting that SES did not receive funding from the federal government, and the company's bankruptcy was a direct result of its failure to find third-party investors).

152. *Id.*

VII. CONCLUSION

The expiration of the 1705 Program last September removed a key incentive for banks to lend to solar and other renewable energy projects.¹⁵³ Major strides in solar power technology¹⁵⁴ and project finance structures¹⁵⁵ have positioned the solar industry for future success, yet lenders remain hesitant to finance utility-scale solar projects. It is this author's belief that domestic lenders will eventually follow the lead of European banks and reduce the cost of renewable energy project debt. In the meantime, a federal loan guarantee program focused on energy generation projects utilizing commercially-proven technology will not only incentivize project lending so as to maintain the solar industry's progress, it will also create jobs without exposing taxpayer dollars to the risks associated with lending to emerging technology manufacturers.¹⁵⁶ Of course, we can also adhere to strict free market principles when it comes to renewable energy;¹⁵⁷ but that choice comes with risks as well. *Fortune Magazine's* Brian Dumaine warns, "If the subsidies are killed, America is choosing not to grow a new industry and create jobs. If we don't want them, China, India and Japan are happy to take them."¹⁵⁸

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153. See *supra* Part V.A-B.

154. See *supra* Part II.

155. See *supra* Part IV.A.

156. See *supra* Part VI.A-C.

157. See generally ANDREW P. MORRIS ET AL., THE FALSE PROMISE OF GREEN ENERGY (2011) (expounding on the ill-effects green energy programs).

158. Brian Dumaine, *Washington's Job-Killing Act*, FORTUNE, Sept. 5, 2011, at 14.

